ensoBox™ Functional Description

The ensoBox™ provides features, functionality, services, and back office management support required for running an ISP business. From the standpoint of an ISP Franchise, the ensoBox™ provides the tools required to operate a successful ISP. These tools are called ensoOS™ and allow ISP Franchise's to perform:

Franchise Management Tools

Subscriber provisioning
Subscriber account management
Subscriber billing
Local network monitoring and management of the ensoBox™

Subscriber Access

From the standpoint of a franchise subscriber the ensoBox™ provides entry points to the Internet from anywhere in the world. A subscriber can access the Internet by simply dialing a local telephone number using an analog modem and a computer. Upon initiating a dial request to an ensoBox™, a subscriber is challenged to enter a valid userid/password to make a successful connection. If the subscriber is validated he can browse the Internet or access services offered by the ensoBox™. These services are called ensoServices™ and include ensoPortal™, ensoMail™, ensoChat™, ensoNews™, ensoWeb™ (web hosting service), and anonymous FTP. ensoVDO™ (video conferencing service) will be offered at a future date. To access services, a subscriber must direct his browser to the ensoPortal™ homepage where the subscriber will be challenged to enter a userid/password. If the subscriber is validated service icons will show up on his ensoPortal™ homepage, which allows the subscriber to read/send his email messages, create/view/modify his personal web page, chat with other ensoBox™ subscribers, enter newsgroups, or download files from an anonymous FTP server. The subscriber interface is a standard web browser such as Netscape Navigator or Internet Explorer.

All of the equipment and a majority of the services software are commercial off the shelf (COTS) components. That means they are widely available and supported world-wide. ensoOS™ is ensoport.com™, Inc. proprietary software, which means it cannot be commercially reproduced by anybody other than ensoport.com™. The ensoOS™ will be supported by the ensoport.com™ NOC.

Nodes

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The ensoBox™ is an integration of three nodes: Core Node, Access Node, and Services Node. Alone, each node solves only a piece of the ISP puzzle. However, when integrated together, the ensoBox™ offers dial up access to the Internet, a toolbox of services for subscribers, a means for ISP Franchises to properly manage and bill subscribers, and a means by which ISP Franchises can settle monthly payments to ensoport.com™, Inc.. Each node performs specific tasks, and tasks performed by one node feeds other tasks performed at the other two nodes. This type of architecture allows for ease of management and scalability of the ensoBox™ and its components. The ensoBox™ is designed to grow as an ISP business grows, and it makes this growth affordable and manageable for the ISP Franchise.

The following paragraphs discuss the functionality of each node in more detail.

The Core Node

The Core Node is the "middle man" between the Internet and the Public Switched Telephone Network (PSTN). It connects directly to the Internet via a PRI (T1 or E1), T1, or E1. It also connects directly to the Access Node, which, in turn, connects to the public telephone network (PSTN) via multiple PRIs, T1s, E1s, or POTS analog lines. It links the components of all three (3) nodes together.

The Core Node is the intermediary between subscribers and their access to the Internet and ensoServices™. These services (web portal, web hosting, email, news, and chat) reside on application servers that are located in the Services Node (see Services Node section for more details). The Core Node supports subscriber authentication, authorization, and accounting (AAA). AAA functionality is supported by a RADIUS server and LDAP server located within the Core Node. AAA controls subscriber access to services and web browsing. AAA records (subscriber, call start time, call end time) are collected by the RADIUS server and used to feed the ensoport.com™ billing system. DNS servers within the Core Node provide primary DNS for services resolution, while Internet address resolution is provided by DNS servers at the ensoport.com™ data center. The ensoBox™ also provides secondary DNS for Internet address resolution.

Figure 2 describes DNS resolution.

The Core Node provides data storage for all subscriber data (portal, email, web hosting, account data, etc.) via a Network Attached Storage (NAS) device. A Tape Jukebox stores daily, weekly, and monthly backups of all the ensoBox™ data, operating system images, and equipment software images. Data backups are done by the Backup Server, and can be scheduled daily, weekly, monthly, etc., as well as either full or partial backups.

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The Core Node provides VPN connectivity between the ensoBox™ and ensoport.com™ data center. This allows the ensoBox™ to securely communicate with back office ensoOS™ management systems located at the data center. The VPN is IPSec compliant and uses Cisco routers on each end of the

5   VPN tunnel. The ensoBox™ does comply with all IPSec regulations for encryption in countries outside the United States.

The Access Node

10   The Access Node supports dial up connectivity (56 Kbps) to subscribers, and stores web content at the edge of the Internet, which reduces Internet network delay and improves subscriber response time for downloading information from the Internet. The Access Node (base configuration) consists of multiple PRIs, T1s, E1s, or POTS analog lines and supports up to 10,000 subscribers. Additional subscribers are supported by adding more Remote Access Servers (Cisco AS5300) and telephone circuits (PRIs,

15   T1s, E1s, or POTS) to the Access Node, which can be easily scaled to support up to 50,000 subscribers.

Content Caching

20   The Access Node contains a cache engine that stores Internet content locally within the ensoBox™. This improves subscriber response time by eliminating network delay when retrieving information from the Internet. Network delay is reduced for two reasons:

1. 40-50% of Internet content (static objects) is stored locally in the cache engine. This eliminates
25   the delay for retrieving information on the Internet.
2. Services are supported locally at the ensoBox™ instead of at a data center located somewhere on the Internet. This eliminates both Internet backbone delay and server processing delay (the ensoBox™ servers support between 10,000 and 50,000 subscribers, whereas data center servers support millions of subscribers).

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Overall, approximately 70% of subscriber requests are processed at the edge of the Internet by the ensoBox™.

The cache engine also reduces the bandwidth required by the direct connection to the Internet.
35   Because of the cache engine and the fact that server processing is being done locally, the bandwidth required for connecting to the Internet is reduced. In a distributed model such as the ISP

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